REMARKS

This submission is intended as a full and complete response to the Office Action dated February 4, 2009. In the Office Action, the Examiner notes that claims 1-32 are pending, of which claims 1-32 stand rejected. Claims 1-32 continue unamended.

THE CLAIMED INVENTION

The claimed invention is of commercial significance to both sellers and buyers of commercial pipeline gas, the price of which is determined based upon its BTU value. This is the same basis used by local gas companies for billing their residential and commercial customers.

Existing methods for characterizing hydrocarbon streams require separation of the liquid and gas phases for separate analysis. The claims of the instant application are directed to a process and apparatus that is counter to the current industry practice.

Independent claim 1 addresses the problem of compositional analysis of a pressurized multi-phase fluid stream flowing in a pipeline. The fluid stream consists of a majority component that is hydrocarbon gas, and a minor component consisting of one or more hydrocarbon liquids and water in the form of vapor, aerosols, droplets and/or liquid streams. A homogeneous sample of the majority component and the minority component is obtained by injecting one or more surface active agents into the fluid stream in an injection zone. The surface active agent(s) are injected at a rate that is sufficient to form a stable uniform foam from the hydrocarbon gas and the one or more hydrocarbon liquids and the water. The surface active agent(s) are mixed with the fluid stream in a mixing zone to form this uniform foam composition which flows through the pipeline downstream of the mixing zone. A portion of the uniform foam composition is withdrawn from the pipeline at a sampling point, and the withdrawn portion is passed through a sampling loop that is in communication with the pipeline. A sample of predetermined volume of the foam is removed from the sampling loop for compositional analysis, and analyzed to determine the amount of hydrocarbon and water present. Dependent claims 2 - 18 are directed to additional method steps and/or limitations.

Independent claim 19 is directed to an apparatus for obtaining a compositional analysis of a homogeneous sample of a multi-phase pressurized fluid stream flowing

through a pipeline. Like claim 1, the preamble of claim 19 specifies that the fluid stream includes a hydrocarbon gas as a major component and a minor component consisting of one or more hydrocarbon liquids and water mixed with the gas. The apparatus of claim 19 comprises an injection means for adding a predetermined amount of one or more surface active agents to the fluid stream, a means for mixing the one or more surface active agents with the components of the fluid stream in a mixing zone to form a uniform foam composition in the pipeline, a sampling probe located in a sampling zone in the pipeline downstream of the mixing zone for removing a portion of the foam composition from the pipeline, a sampling conduit on the exterior of the pipeline in fluid communication with the probe, a sample removal means for withdrawing a predetermined volume of the foam composition from the exterior sampling conduit, and an analytical means for identifying the hydrocarbon and water components of the foam sample. Dependent claims 20 - 24 are directed to additional apparatus elements and/or limitations.

Independent claim 25 is directed to an apparatus for providing a homogeneous sample of a multi-phase pressurized fluid stream flowing through a pipeline. The preamble of claim 25 specifies that the fluid stream includes a hydrocarbon gas as a major component, and one or more hydrocarbon liquids and water mixed with the gas. The apparatus of claim 25 comprises an injection means for adding a predetermined amount of one or more surface active agents to the fluid stream; a means for mixing the one or more surface active agents with the components of the fluid stream in a mixing zone to form a uniform foam composition in the pipeline; a sampling probe located in a sampling zone in the pipeline downstream of the mixing zone for removing a portion of the foam composition from the pipeline; a sampling conduit on the exterior of the pipeline in fluid communication with the probe; and a sample removal means for withdrawing a predetermined volume of the foam composition from the exterior sampling conduit. Dependent claims 26 - 30 are directed to additional apparatus elements and/or limitations.

Independent claim 31 is directed to an apparatus for creating a homogeneous gas-liquid mixture for sampling. The apparatus includes an injection zone including injection means having a discharge port in fluid communication with a moving a stream of gas-

liquid mixture contained in a pipeline for injecting a foam-generating surfactant agent into the gas-liquid stream. In addition, the apparatus includes a downstream mixing zone having a mixing means for mixing the surfactant and the gas-liquid stream to induce a uniform foam composition. Finally, the apparatus comprises a sampling zone downstream of the mixing zone that includes a sampling means for removing a sample of the foam composition from the stream in the pipe. Dependent claim 32 is directed to additional apparatus elements and limitations.

REJECTION OF CLAIMS UNDER 35 U.S.C. §103(a)

Claims 1 - 32 were variously rejected under 35 U.S.C. §103(a). In particular, claims 1 - 7, 9 - 12 and 14 - 16 and 18 - 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Griston et al. U.S. Patent Number 5,190,103 (hereinafter "Griston et al.") in view of Remke et al. U.S. Patent Number 3,133,437 (hereinafter "Remke et al."), further in view of Mullen U.S. Patent Number 5,597,950 (hereinafter "Mullen"); claims 8 and 17 were rejected under 35 U.S.C. §103(a) as being unpatentable over Griston et al. in view of Remke et al., in view of Mullen, and further in view of Walker et al. U.S. Patent Number 3,135,113 (hereinafter "Walker et al.); and claim 13 was rejected under 35 U.S.C. §103(a) as being unpatentable over Griston et al. in view of Remke et al., in view of Mullen, and further in view of Djabbarah et al. U.S. Patent Number 5,470,749.

Applicant respectfully traverses all of the grounds of rejection set forth under 35 U.S.C. §103(a).

SUMMARY OF THE PRIMARY CITED REFERENCES

Griston et al. U.S. Patent Number 5,190,103

Griston et al., entitled "Metering of Two-Phase Fluids Using Flow Homogenizing Devices and Chemicals," is directed to metering a two-phase fluid, such as wet steam, by injecting a surfactant to form a "pseudo-single phase" fluid. The pseudo-single phase fluid is metered. The problem addressed by Griston et al. involves the ability to use conventional single-phase rate metering methods to meter the total quantity of fluid (gas and liquid) passing through a pipeline. Griston et al. shows a vapor fraction detector;

however, there is nothing in the reference that addresses the problem of determining the commercial value of the fluids flowing in the pipeline, e.g., in terms of BTU value.

Remke et al. U.S. Patent Number 3,133,437

Remke et al., entitled "Measuring the Water Content in Oil and Water Mixtures," is directed to a method and apparatus for measuring the composition of immiscible hydrocarbon and water mixtures. While Remke et al. acknowledges that gas is often present in oil and water mixtures, the method and apparatus described is not capable of measuring the quantity of gas. Indeed, prior to measuring the oil and water mixture, gas is removed by a degasser. (See Remke et al., col. 1, lines 19-22).

Mullen U.S. Patent Number 5,597,950

Mullen, entitled "Surfactant Monitoring by Foam Generation," is directed to a device for monitoring the presence or absence of active surfactant or other surface active agents in a solution or flowing stream. This device operates by introducing a gas under a surface of a surfactant-containing solution to generate a foam, and sensing a quantity of the foam above the surface, the quantity corresponding to active surfactant concentration. Mullen in no way relates to creation of a homogeneous gas-liquid mixture for sampling to determine the commercial value of hydrocarbon gas present in a gas stream containing minor amounts of liquid.

THE LEGAL STANDARDS UNDER §103

As a preliminary matter, we believe that it would be helpful to review the appropriate standard under 35 U.S.C. § 103 for analyzing the features of a claim with respect to the prior art.

The examiner bears the initial burden of factually supporting any prima facie conclusion of obviousness. If the examiner does not produce a prima facie case, the applicant is under no obligation to submit evidence of nonobviousness. The key to supporting any prima facie conclusion of obviousness under 35 U.S.C. § 103 is the clear articulation of the reason(s) why the claimed invention would have been obvious. The Supreme Court in KSR International Co. v. Teleflex Inc., 550 U.S. 398, ___,127 S. Ct. 1727, 1731 (2007) noted that the analysis supporting a rejection under 35 U.S.C. § 103 should be made explicit. The Examiner's basis for the rejection should identify a

rationale that would have led a person having skill in the art to combine selected features from each reference in a way that would have resulted in a method or device corresponding to any of the rejected claims. *See* KSR Int'l Co. v. Teleflex, Inc., 127 S. Ct. 1727, 1741 (2007). "[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness." (In re Kahn, 441 F. 3d 977, 988 (Fed. Cir. 2006) cited with approval in KSR).

Furthermore, any rejection based on obviousness under §103 must be based upon facts that are interpreted without hindsight reconstruction of the invention from the prior art. *See* In re Warner, 379 F.2d 1011, 1017 (CCPA 1967), cert. denied, 389 U.S. 1057 (1968). Of course, implicit in any analysis under §103 is that the all of the claim limitations are properly considered. *See* In re Wilson, 424 F.2d 1382, 1385 (CCPA 1970) ("All words in a claim must be considered in judging the patentability of that claim against the prior art.") The references must be taken in their entireties, including those portions which argue against obviousness. Bausch & Lomb, Inc. v. Barnes-Hind/Hydrocurve, Inc., 230 U.S.P.Q. 416, 420 Fed. Cir. 1986). It is impermissible within the framework of the 35 U.S.C. § 103 to pick and choose from a reference only so much of it as will support a conclusion of obviousness to the exclusion of other parts necessary to a full appreciation of what the reference fairly suggests to one skilled in the art. Id. at 419.

THE CLAIM REJECTIONS SHOULD BE WITHDRAWN

Turning to the claim rejections, Applicant believes that the following remarks will convince the Examiner that a *prima facie* case of obviousness has not been established, or if established, that it has been overcome, and that the rejections under §103 based on the cited references should be withdrawn.

Claims 1 - 18

Claim 1 and its dependent claims 2 - 7, 9 - 12, 14 - 16 and 18 were rejected under 35 U.S.C. §103(a) as being unpatentable over Griston et al. in view of Remke et al., and further in view of Mullen. Claims 8 and 17 were rejected under 35 U.S.C. §103(a) as

being unpatentable over Griston et al. in view of Remke et al., in view of Mullen, and further in view of Walker et al. It is respectfully submitted that the cited references are not properly combinable under the proper legal standards for obviousness, and that even if the references were properly combinable, they do not, alone or in combination, teach or suggest all of the limitations of claims 1 - 18.

In regards to the first portion of the preamble and steps (a) and (b) of claim 1, the Examiner relied upon Griston et al. stating:

> "... Griston discloses a method for obtaining a homogenous sample for compositional analysis of a pressurized multi-phase fluid stream flowing in a pipeline (C4/L22-30), the method comprising:
> a. injecting one or more surface active agents ("saa") into the fluid stream in an injection zone at a rate that is sufficient to form a stable uniform foam of the gas and the one or more hydrocarbon liquids and water components (C3/L55-68);
> b. mixing the one or more saa with the fluid stream in a mixing zone to form a uniform foam composition (C3/L55-68) flowing in the pipeline downstream of the mixing zone (C4/L55-61)."

First, Applicant is not claiming the individual steps of forming a stable uniform foam of the gas and the one or more hydrocarbon liquids and water components by injecting surface active agents, or mixing surface active agents in a mixing zone to form a uniform foam composition flowing in the pipeline downstream of the mixing zone. Rather, these steps (a) and (b) are claimed in combination with steps (c) through (f) with respect to a fluid stream consisting of a majority component of hydrocarbon gas and the minor component consisting of a minor portion of one or more hydrocarbon liquids and water in liquid streams. Therefore, using Griston et al. as a primary reference to deem claim 1 unpatentable is improper.

Griston et al. provides specific examples of forming foam from steam and water, or air and water, to form a so-called "pseudo-single phase" fluid for the disclosed purpose of more accurately metering the flow rate of fluid through a pipeline. However, it is respectfully submitted that Griston et al. does not in any way relate to the problems

associated with natural gas sampling for stream quality,i.e., BTU determination as required by the claims of the present application. Rather, Griston et al. provides a proposed solution for wet steam flow measurement. In addition, in contrast to claim 1 of the present invention where a sample of a foam composition is analyzed to determine its composition, Griston et al. is concerned only with metering the total flow of the fluid through the pipeline. While Griston et al. shows a vapor fraction detector, there is no disclosure or even a suggestion that the metering includes determination of the overall amount of hydrocarbon present, including hydrocarbon in the gas phase and its liquid condensate, as disclosed in the present application. Indeed, Griston et al. lacks the recognition of the practical commercial value in analyzing the hydrocarbon condensate of the stream. In the vapor fraction determination, the hydrocarbon condensate is presumably ignored, leading to substantial error in determining the BTU value of the stream, since the condensate may contribute significantly to the BTU value of the end product. This is the very problem that the claims of the present application address.

With respect to the remainder of the preamble, which sets forth the characteristics of the fluid stream which is subjected to compositional analysis, the examiner admitted that Griston does not disclose that the fluid stream consists of a majority component of hydrocarbon gas and the minor component consisting of a minor portion of one or more hydrocarbon liquids and water in liquid streams. To purportedly teach this feature, the Examiner relied on Remke et al. This reference discloses a method and apparatus for measuring the composition of immiscible hydrocarbon (oil) and water mixtures, which may comprise a gas component that is separated from the combined oil and water flow prior to metering.

The Examiner stated that "[t]he references are analogous because both references are directed toward analysis of components in a pipeline," and that "[i]t would have been obvious to one having ordinary skill in the art at the time of the invention to monitor the hydrocarbon and water composition because doing so is necessary to efficiently produce a well." However, Applicant submits that this is precisely the type of conclusory statement warned against by the Federal Circuit (In re Kahn) and approved by the Supreme Court in the controlling KSR decision. Indeed, while both Griston et al. and Remke et al. broadly are used for measuring certain contents in a pipeline, that is where

the similarity ends. The references are actually directed to distinct and separate problems, and one of ordinary skill in the would not logically look to one to solve problems in the art of the other.

Even if the references were combinable, it is submitted that Remke et al. is not properly characterized by the Examiner. In particular, the Office Action stated:

> "Remke discloses a method of measuring the composition of hydrocarbon and water in a pipeline wherein the fluid stream consisting of a majority component of hydrocarbon gas, the minor component consisting of a minor proportion of one or more hydrocarbon liquids and water in the form of vapor, aerosols, droplets and/or liquid streams (C1/L10-33)."

However, Remke et al. does not disclose that the fluid stream consists of a majority component of hydrocarbon gas. Rather, Remke et al. discloses that the disclosure relates to a method and apparatus for measuring the water content of oil and water mixtures. Gas is only mentioned as a secondary component, not the majority component as claimed. In particular, Remke et al. states:

> "...production fluid of an oil well often contains water in addition to oil and gas. The gas is separated from the production fluid by a separator and the oil and water mixture passed to other separation equipment." (Remke et al., col. 1, lines 19-22).

It is respectfully submitted that the disclosure of Remke et al. cannot, in any way, be construed as a disclosing "majority component" of hydrocarbon gas as claimed. Quite to the contrary, in a system including the metering device in Remke et al., the gas is explicitly *removed* from the oil and water mixture:

> "FIGURE 4 illustrates the applicability of our invention, specifically the cyclone device of FIGURES 1-3, in conjunction with the production line 51 of an oil well 52. The production fluid is withdrawn from production line 51 via line 53 and where gas is present in the production fluid the production fluid [sic] is transferred to a surge tank or degasser 54. The degasser 54 separates gas from the oil and water mixture and the gas can

be withdrawn from the top via line 56, passed through a gas meter 57, and thence via line 58 to the atmosphere or storage, or via lines 58, 59 back to production line 51. The oil and water is passed via line 61, for example from the lower end of degasser 54, through a meter pump 62, and thence to the novel cyclone means 11 of our invention." (Remke et al., col. 4, lines 36-49).

Therefore, notwithstanding Applicant's firm position that the references are not properly combinable, it is respectfully submitted that they do not teach or even suggest the limitations of claim 1 as asserted by the Examiner. Rather, Remke et al. teaches away from the present claims.

Finally, the Examiner also admitted that the reference [sic][1] does not disclose "withdrawing a portion of the foam composition from the pipeline at a sampling point; passing the portion of the foam composition withdrawn from the pipeline through a sampling loop that is in communication with the pipeline; removing a sample of predetermined volume of the foam from the sampling loop for compositional analysis; and analyzing the foam to determine the amount of hydrocarbon and water present." These are steps set forth in (c) – (f) of claim 1.

In order to assert that these features are known in the art, the Examiner relies upon Mullen:

"Mullen discloses a method of monitoring a surfactant that includes withdrawing a portion of the foam composition from the pipeline at a sampling point (Figure 1); passing the portion of the foam composition withdrawn from the pipeline through a sampling loop that is in communication with the pipeline (Figure 1); removing a sample of predetermined volume of the foam from the sampling loop for compositional analysis (Abstract); and analyzing the foam to determine the amount of hydrocarbon and water present (C3/L52-65). Additionally,

[1] Based on Applicant's understanding of the Examiner's position and application of Griston et al. and Remke et al., it is apparent that the admission actually relates to both references.

the reference discloses that such a continuous measurement can indicate if surfactant level is too high for discharge (C3/L60-65)."

However, Applicant respectfully submits that, like the characterization of Remke et al., this is incorrect. Mullen attempts to solve a completely different problem, i.e., determining the amount of surfactant in a solution, where that amount is unknown. Gas is introduced to the solution to induce foaming. The determination made by the device in the Mullen reference is unconcerned with the amount of gas, as that is introduced only to cause the unknown amount of surfactant to foam. In contrast, in claim 1 of the instant application, surfactant is introduced to a flowing gas stream that contains a minor amount of liquid in order to induce foaming. The reason for this is to form a uniform foam composition, which is withdrawn at a sampling point, passed through a sampling loop, removed for compositional analysis, and analyzed to determine the amount of hydrocarbon and water present.

In addition, Applicant also respectfully submits that the rationale asserted by the Examiner to combine the references is inaccurate. First, the Examiner stated that "[t]he references[2] are analogous because both references are directed towards the use of a foam to monitor a surfactant." This is simply not accurate. Griston et al. creates a foam by adding a surfactant, and the total "pseudo-single phase" fluid is metered, while Mullen adds gas to a solution having an unknown amount of surfactant in order to estimate the amount of surfactant present in the solution. The Examiner also stated that "[i]t would have been obvious to one having ordinary skill in the art at the time of the invention to use the monitoring of Mullen in the method of modified Griston because it is necessary to monitor surfactant levels so as to take anti-foaming measures for discharge." The present claim 1 is not in any way concerned with anti-foaming measures. Only dependent claim 9 deals with addition of a defoaming agent, but there is no need to monitor the surfactant levels, as the amount of surfactant injected (as recited in step (a) of claim 1) will be known to the user ("...at a rate that is sufficient to form a stable uniform foam...").

[2] While not specified in the Office Action, the only possible references that the Examiner can be referring to is Griston et al. and Mullen, as Remke et al. does not even mention the use of surfactants.

Therefore, since the reasoning set forth by the Examiner lacks any rational underpinning as required to support a legal conclusion of obviousness, and indeed is factually inaccurate with respect to the present claims, the combination of the references as asserted is not proper. Since the basis of the rejection based on obviousness under §103 is untenable, it must be withdrawn.

Even if the references were properly combinable, they do not, individually or in combination, teach or suggest the limitations of claim 1. To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. In view of the above remarks, it is respectfully submitted that a *prima facie* case of obviousness of the present invention as defined by claims 1 over Griston et al. in view of Remke et al. and further in view of Mullen has not been made, and therefore claim 1 is patentable over the cited art. Claims 2 - 18 depend on claim 1, and are also allowable for at least the same reasons as set forth above with respect to claim 1.

Claims 19 - 24

Independent claim 19 and its dependent claims 20 – 23 were also rejected under 35 U.S.C. §103(a) as being unpatentable over Griston et al. in view of Remke et al., and further in view of Mullen. The Examiner did not recite separate rationales for the combination of these references. Therefore, as discussed with respect to claim 1 and its dependent claims 2-18, it is respectfully submitted that the cited references are not properly combinable under the proper legal standards for obviousness.

Notwithstanding the lack of a basis for such combinations, Applicant submits that even if the references were properly combinable, the references, alone or in combination, do not teach or suggest all of the claim requirements.

In particular, the Examiner cited Griston et al. as disclosing the first portion of the preamble and elements (a) and (b) of claim 19. With regard to the remainder of the preamble which sets forth the characteristics of the fluid stream that is subjected to compositional analysis, the Examiner cited Remke et al. Finally, with respect to elements (c) – (f), the Examiner cited Mullen. The Examiner cited the same portions of the references in his rejection of claim 19 as cited with respect to claim 1. Therefore, for at least the same reasons discussed above, Griston et al., Remke et al. and Mullen do not,

alone or in combination, disclose all of the elements of claim 19, which is directed to an apparatus for obtaining a compositional analysis of a homogeneous sample of a multi-phase pressurized fluid stream flowing through a pipeline. The fluid stream includes a hydrocarbon gas as a major component and a minor component consisting of one or more hydrocarbon liquids and water mixed with the gas. The apparatus of claim 19 comprises (a) an injection means for adding a predetermined amount of one or more surface active agents to the fluid stream, (b) a means for mixing the one or more surface active agents with the components of the fluid stream in a mixing zone to form a uniform foam composition in the pipeline, (c) a sampling probe located in a sampling zone in the pipeline downstream of the mixing zone for removing a portion of the foam composition from the pipeline, (d) a sampling conduit on the exterior of the pipeline in fluid communication with the probe, (e) a sample removal means for withdrawing a predetermined volume of the foam composition from the exterior sampling conduit, and (f) an analytical means for identifying the hydrocarbon and water components of the foam sample. .

Therefore, Applicant respectfully submits that the basis of the present rejection is untenable since there is no logical rationale for combining the references; even if the references were properly combinable, they do not, individually or in combination, teach or suggest the limitations of claim 19. Claims 20 – 24 depend on claim 19, and are also allowable for at least the same reasons as set forth above with respect to claim 19.

Claims 25 – 30

In addition, independent claim 25 and its dependent claims 26 – 30 were rejected under 35 U.S.C. §103(a) as being unpatentable over Griston et al. in view of Remke et al., and further in view of Mullen. Again, the Examiner did not provide separate rationales for the combination of these references. Therefore, as discussed with respect to claim 1 and its dependent claims 2-18, it is respectfully submitted that the cited references are not properly combinable under the proper legal standards for obviousness.

Notwithstanding, Applicant submits that even if the references were properly combinable, the references, alone or in combination, do not teach or suggest all of the limitations of the claims. The Examiner cited Griston et al. as disclosing the first portion

of the preamble and elements (a) and (b) of claim 19. In regards to the remainder of the preamble, which sets forth the characteristics of the fluid stream which is subjected to compositional analysis, the Examiner cited Remke et al. Finally, with respect to elements (c) – (f), the Examiner cited Mullen. The Examiner cited the same portions of the references in his rejection of claim 25 as cited with respect to claim 1. Therefore, for at least the same reasons discussed above, Griston et al., Remke et al. and Mullen do not, alone or in combination, disclose all of the elements of claim 25, which is directed to an apparatus for providing a homogeneous sample of a multi-phase pressurized fluid stream flowing through a pipeline. The fluid stream includes a hydrocarbon gas as a major component, and one or more hydrocarbon liquids and water mixed with the gas. The apparatus comprises (a) an injection means for adding a predetermined amount of one or more surface active agents to the fluid stream; (b) a means for mixing the one or more surface active agents with the components of the fluid stream in a mixing zone to form a uniform foam composition in the pipeline; (c) a sampling probe located in a sampling zone in the pipeline downstream of the mixing zone for removing a portion of the foam composition from the pipeline; (d) a sampling conduit on the exterior of the pipeline in fluid communication with the probe; and (e) a sample removal means for withdrawing a predetermined volume of the foam composition from the exterior sampling conduit.

Therefore, Applicant respectfully submits that the basis of the present rejection is untenable since there is no logical rationale for combining the references; even if the references were properly combinable, they do not, individually or in combination, teach or suggest the limitations of claim 25. Claims 26 – 30 depend on claim 25, and are also allowable for at least the same reasons as set forth above with respect to claim 25.

Claims 31 – 32

Independent claim 31 and its dependent claim 32 were rejected under 35 U.S.C. §103(a) as being unpatentable over Griston et al. in view of Mullen. The Examiner did not recite separate rationales for the combination of these references. Therefore, as discussed with respect to claim 1 and its dependent claims 2-18, it is respectfully submitted that the cited references are not properly combinable under the proper legal standards for obviousness.

Even if Griston et al. and Mullen were properly combinable, the references, alone or in combination, do not disclose the claim limitations of claim 31, which is directed to an apparatus for creating a homogeneous gas-liquid mixture for sampling. The apparatus includes an injection zone including injection means having a discharge port in fluid communication with a moving a stream of gas-liquid mixture contained in a pipeline for injecting a foam-generating surfactant agent into the gas-liquid stream; a downstream mixing zone having a mixing means for mixing the surfactant and the gas-liquid stream to induce a uniform foam composition; and a sampling zone downstream of the mixing zone that includes a sampling means for removing a sample of the foam composition from the stream in the pipe.

As discussed above with respect to claim 1, Mullen does not disclose injecting a foam generating surfactant agent into a gas-liquid stream. Rather, Mullen is directed to an entirely different problem of determining the amount of surfactant in a solution, and solves this problem by injecting gas to create a foam that is ultimately measured. The apparatus of Mullen includes a container that receives a solution containing an unknown amount of surfactant. Air is introduced into the solution to induce foaming. Using an optical source, foam density can be determined and thus the amount of surfactant determined.

Accordingly, the Examiner's recitation of Mullen and its Figure 1 to recite the claim limitations of "injecting a foam-generating surfactant agent into the gas-liquid stream" and "a sampling zone downstream of the mixing zone that includes sampling means for removing a sample of the foam composition from the stream in the pipe" is not accurate. There is simply no "sampling zone" as claimed in Mullen. In particular, the sampling zone of claim 31 includes a "sampling means for removing a sample of the foam composition from the stream in the pipe." However, there is no sampling means for removing a sample of the foam composition from a pipe in Mullen. Rather, a liquid solution is introduced into a container, and foam is created in that container by injection of air. There is no discussion in Mullen about removing foam downstream from a mixing zone as claimed by Applicant (where the foam is created by injection of foam generating surfactant) for sampling – indeed, the surfactant-containing solution is only removed in

Mullen through an outlet on the container at a predetermined solution height to prevent an excess buildup of the surfactant-containing solution.

Therefore, Applicant respectfully submits that the basis of the present rejection of claim 31 is untenable since there is no logical rationale for combining Griston et al. and Mullen. Even if these references were properly combinable, they do not, individually or in combination, teach or suggest the limitations of claim 31. Claim 32 depends on claim 31, and is also allowable for at least the same reasons as set forth above with respect to claim 31.

CONCLUSION

In view of the remarks presented above, Applicant submits that this Response addresses all of the points raised in the Office Action and that all of the claims are in condition for allowance. Accordingly, both favorable reconsideration of this application and prompt issuance of a Notice of Allowance are earnestly solicited. If, however, the Examiner believes that there are any unresolved issues concerning any of the claims, we respectfully request that the Examiner telephone Ralph J. Crispino at (212) 885-9358 or Thomas E. Spath at (212) 885-9250 so that appropriate arrangements can be made for resolving such issues as expeditiously as possible.

The Commissioner is hereby authorized to charge any additional fees, or to credit any overpayment, due by reason of this Response to Deposit Account No. 01-0035.

Respectfully submitted,

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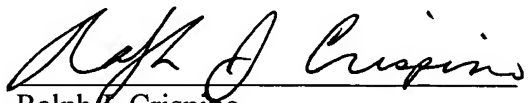

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